

REMARKS

This application has been reviewed in light of the Office Action dated December 22, 2008. Claims 29-48 are pending in this application, with claims 29, 39 and 48 being independent. Claim 28 has been cancelled, and claims 29-48 have been added. Favorable consideration and allowance are respectfully requested.

The Office Action objected to the drawings under 35 CFR § 1.83(a). In response, a Supplemental Submission Of Replacement Drawing Sheets has been filed concurrently herewith.

The Office Action included a double-patenting rejection in view of U.S. Patent No. 6,524,101. In a telephone message exchange with Applicants' representative, the Examiner confirmed that this rejection was included inadvertently, and should not have been made.

The Office Action rejected claims 17-28 under 35 U.S.C. § 112 as containing subject matter not described in the specification in such a way as to reasonably convey that the inventors were in possession of the invention. This rejection is rendered moot by the cancellation of those claims in the April 22, 2009 Amendment under 37 C.F.R. § 116, and new claims 29-48 are believed to be in full compliance with Section 112. In view of the foregoing, Applicants respectfully request the Examiner to remove the Section 112 rejection.

The Office Action rejected claims 17-28 under 35 U.S.C. § 103 as obvious from U.S. Patent No. 6,049,743 to Baba. Applicants respectfully traverse this rejection, and respectfully submit that new claims 29-48 are patentable over Baba, for the reasons set forth below.

As recited in independent claim 29, the present invention relates to a CAD system that includes a computer, a display device, an input device and at least one design tool. The computer directs the display device to display an image of a dental restoration body, with the image including a plurality of dentally specific indicia. The input device enables the user to select a portion of the image to be modified, with the selected portion being defined by at least one of the plurality of dentally specific indicia. The display tool enables the selected portion to be modified in any of a plurality of directions.

Computer-aided design and manufacturing (CAD/CAM) systems that provide for the design and fabrication of a dental restoration body are known in the art. Such prior art systems typically store models of restoration bodies in a database, the models being defined in part in terms of characteristics of the tooth, such as for example, an equator, marginal crests, fissures and the like. In order to properly design a restoration body that is ready for fabrication, however, it is typically necessary to modify portions of the model with design tools, such as for example, by reducing or enlarging a portion of the model in certain directions.

Before such processing can take place, however, it is necessary to select the portion that is to be modified. Prior art systems have provided for such selection by providing a menu or dialogue box, or allowing the portion to be modified to be identified by drawing in a boundary line. Such approaches, however, while perhaps generally acceptable for some applications, suffer from the significant drawback that the boundaries of the region to be modified wind up being arbitrary, as opposed to being dentally specific. That, in turn, results in the overall quality of the dental restoration body being inferior and a sub-optimal representation of the actual tooth that is being replaced.

The present invention overcomes this drawback by providing an image that includes multiple dentally specific indicia, and by allowing a user to select a portion of the image to be modified that is defined by at least one of those dentally specific indicia. By providing for the selection of a portion of the image that is defined by at least one of the dentally specific indicia, a portion that bears a much greater relation to the geometry and other characteristics of a tooth can be selected and modified, resulting in a substantially more accurate dental restoration body.

Baba relates to a method of designing a dental prosthesis model, in which a database 3a stores data defining standard pontic models. The portion of Baba relied upon primarily in the Office Action (col. 7:65 to col. 8:22) describes that the database 3a stores what it calls “morphology definition data” that in part describe the pontic model, which pontic model is used to design a dental prosthesis model of a crown or bridge. The morphology definition data includes such things as cuspid apexes 11, grooves 12 and ridges 13, a marginal ridge 14, a height of contour 15 and a marginal line ML, which items define the morphology of the model. Baba expressly calls this data “characteristic morphology” data. See Baba at col. 8:2.

The pontic model in Baba also includes data other than the characteristic morphology data. In particular, the pontic model also includes multiple so-called “auxiliary lines” 18 which define a plurality of patches $P(n)$ and deforming regions $A(n)$, which are depicted as follows:

Fig.4A

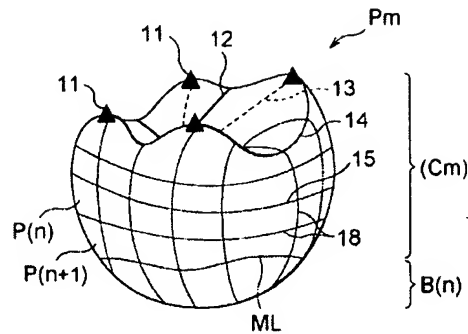
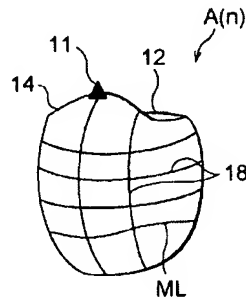


Fig.5



These auxiliary lines 18 are not dentally specific indicia. To the contrary, as their name indicates, these lines 18 are auxiliary to the data that defines the tooth's morphology (that is, the characteristic morphology data, such as the cuspid apices 11, grooves 12, ridges 13, etc.). Indeed, the auxiliary lines are expressly distinguished from such characteristic morphology data. Thus, for example, the auxiliary lines that define a plurality of deforming regions A(n) (see Fig. 5 above) are made by extending the grooves on the occlusal surface vertically downward. Such auxiliary lines are not, and cannot be said to be, dentally specific indicia, since they were arbitrarily placed on the surface of

the pontic model. See, e.g., col. 8:30-35 (“Here, the auxiliary lines 18 defining patches in the base region are arbitrarily set as lines converging onto the base surface, lines naturally extending downward, and the like.”) (emphasis added).

Significantly, in Baba, it is these arbitrary auxiliary lines 18 that define the deforming regions A(n), which deforming regions are used for deformation. As Baba explains, these deforming regions A(n) are used for performing deformation on the computer. Col. 8:15-18. The deformation regions are not defined in any way by any of the characteristic morphology data (i.e., the cuspid apexes, grooves or ridges), or by any data that includes or represents dentally specific indicia.

In the present invention, in stark contrast, the selected portion of the image to be modified is defined by at least one of a plurality of dentally specific indicia. That salient feature of the claims is not taught or suggested by Baba, and Applicants respectfully submit that independent claim 29 is plainly patentable over Baba as a result.

Independent claim 39 is directed to an image processing method and independent claim 48 is directed to a CAD system with its constituent claim elements being written in means-plus-function form. Each of claim 39 and 48 recite the salient feature of claim 29 emphasized above, namely that the selected portion of the image to be modified is defined by at least one of a plurality of dentally specific indicia. Applicants respectfully submit that independent claims 39 and 48 are patentable over Baba for at least the reasons discussed with respect to independent claim 29 above.

The other claims in this application depend from one or another of the independent claims discussed above, and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an

additional aspect of the invention, however, individual consideration or reconsideration, as the case may be, of the patentability of each claim on its own merits is respectfully requested.

CONCLUSION

A Power of Attorney is being filed concurrently herewith.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,

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